## O-12

Salivary immunoglobulin A levels in "rapid" and "slow" plaque formers. K.Y. ZEE* and L.P. SAMARANAYAKE (Faculty of Dentistry, The University of Hong Kong).

Salivary immunoglobulin A (s-IgA) is known to play a role in aggregation of oral bacteria, and hence, may affect the rate of plaque formation. Therefore, the aim of this study was to investigate s-IgA levels in "rapid" and "slow" plaque formers. Forty-nine healthy volunteers were screened for their plaque formation rate. All the subjects received oral hygiene instructions and prophylaxis once a week for 3 weeks in order to upgrade their gingival health. Thereafter, a 3-day no oral hygiene period started in order to assess the plaque formation rate using the plaque index (PI). PI on the buccal surfaces of all the canines, premolars and 1st molars were recorded and 5 subjects with the highest mean PI and 5 with the lowest mean PI were selected as "rapid" and "slow" plaque formers, respectively. Unstimulated whole saliva was collected into a ice-chilled beaker from each of these 10 subjects. The saliva samples were then centrifuged at 10,000g for 10 min. and the supernatants were stored at -70°C until analysis. References curves for s-IgA were established by testing serial dilutions of human IgA with known concentrations. The levels of s-IgA in the saliva of all the subjects were assessed by using a conventional ELISA technique. Differences between the 2 groups were compared by using Student t test. Results showed a statistically significant ($p<0.05$) difference in the mean s-IgA concentration between the "rapid" (9µg/ml ± 1.9) and "slow" (17µg/ml ± 6.3) plaque formers. This suggests that s-IgA may contribute to the differences in the rate of plaque formation in these two groups of subjects.

## O-13

Antigenic proteins in the outer membrane of *Porphyromonas gingivalis*.
B. Yapong[*,1], S. Koontongkaew[1] and M. Ongsakul[2] ([1]Fac. of Dentistry, [2]Fac. of Science, Prince of Songkla University, Hat Yai, Songkhla 90112, Thailand.)

Many methods have been used to identify *Porphyromonas gingivalis* ( *P. gingivalis* ) in subgingival plaque samples including culture techniques, immunological assays and DNA probe. However, immunological assays still appear to have potential in the microbiological diagnosis of periodontal diseases. The purpose of our study was to investigate P. gingivalis outer membrane antigens using electrophoresis and Western blotting. *P. gingivalis* ATCC 33277 was ultrasonically disrupted in a solubilizing solution containing 10mM HEPES, pH7.4, 0.05 mM PMSF and 0.3 % SLS. The supernatant fraction was collected. The pellet was then dissolved in the solubilizing solution. The outer membrane was isolated by centrifugation at 100,000×g for 2 h. Polyclonal antibodies against *P. gingivalis* were raised in rabbits using the supernatant or outer membrane fraction. Characterization and antigenicity of the extracted proteins were studied by SDS-PAGE and Western blot analysis. Five major proteins of outer membrane ranging from 44 to 78 kDa were recognized by sera raised against the supernatant. The 44 -kDa protein exhibited obvious reaction in both supernatant and outer membrane fractions. The specificity of antibodies was confirmed by positive results in indirect immunofluorescence against *P. gingivalis*. These results suggest that the outer membrane of *P. gingivalis* contains antigenic proteins. The 44-kDa surface protein seems to be a potent antigen.

## O-14

Effect of Dexamethasone on Periodontal Healing of Replanted Dog Teeth. V.SAE-LIM*, Z. METZGER, M.TROPE. (University of North Carolina at Chapel Hill, USA).

Previous studies have shown ViaSpan to be an excellent medium for the extended storage of avulsed teeth. Also, it has been shown that replantation of teeth into a 48-hour-old socket resulted in a particularly high degree of inflammatory root resorption. It was hypothesized that this resorption was related to macrophage activation within the tooth socket at this 48-hour time period, resulting in a plethora of cytokines and other products implicated in bone/root resorption. Steroids have been shown to inhibit macrophage activation and its consequences. The purpose of the present investigation was to evaluate histologically, the effect of dexamethasone in the prevention of root resorption in stored and replanted dogs' teeth. Twenty nine roots of 3 beagle dogs were endodontically treated to prevent subsequent inflammatory root resorption of pulpal origin. The teeth were extracted and randomly assigned to 3 groups for 48 hours storage. Group 1. Teeth (n=13) were stored in vials containing ViaSpan only. Group 2. Teeth (n=10) were stored in vials containing ViaSpan and dexamethasone (topical treatment, concentration 16 ug/ml). Group 3. Teeth (n=6) were stored in vials containing ViaSpan only, but dexamethasone was administered intramuscularly (systemic treatment, 0.5mg/kg bw) 2 days prior to, on the day of and the following 2 alternate days after extraction/replantation. After 12 weeks, the dogs were sacrificed, the teeth histologically prepared and evaluated according to Andreasen. The mean percentage complete healing in the Group 2 (85%) was significantly higher than that in Group 1 (69%) and Group 3 (67%). Accordingly, the mean percentage inflammatory and replacement resorption of Group 2 (13%, 3%) were lower than that in Group 1 (22%, 7%) and Group 3 (28%, 5%). There was an indication that topical use of dexamethasone resulted in an increase of complete healing and less resorption complications.

## O-15

Dental and periodontal health status in Thai vegetarians.
A. JAINKITTIVONG* and T. PREMSIRINIRUND
(Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand)

It has been found that the diet of vegetarian is beneficial to oral health, as reflected by a high number of teeth present, improved caries status, and increased the resistance of periodontal tissues. The aim of this study was to compare the dental and periodontal health status in vegetarians with their non-vegetarian controls. Subjects were 130 Thai lactovegetarians who maintained at least 5 years in vegetarian diet and 130 volunteer non-vegetarian controls. All subjects were interviewed about their dietary habit. Of the lactovegetarians, 76.9% had 5-14 years of vegetarianism and the majority (73.8%) ate only one meal a day. The dental and periodontal health status were assessed by oral examination. DMFT and gingival index were registered. The vegetarians and controls did not differ in their caries prevalence (58.5% vs 60.8%; p>0.05). The number of remaining teeth, DMFT and gingival index in the vegetarians and controls were not different (p>0.05). Although the prevalence of periodontal diseases were numerically high in both group, the vegetarians showed significantly lower periodontal disease prevalence than the controls (81.5% vs 95.4%; p=.0008). There were no differences in DMFT and gingival index among the lactovegetarians regarding to their duration of vegetarian diet. This study did not demonstrate better dental health in vegetarians in comparison with their controls but it did show less prevalence of periodontal disease in the vegetarians. This study was supported by the Dental Association of Thailand.

## O-16

Effect of Self-Administered Daily Irrigation on Gingivitis in Orthodontic Patients
V.KERDVONGBUNDIT (Mahidol University, Bangkok, Thailand)

To determine the effect on periodontal health of daily self-administered water irrigation device (Water Pik). Thirty subjects of fully banded orthodontic patients were selected and assigned to two stages. They had moderate chronic generalized gingivitis, free from any abnormal systemic metabolic condition and did not use any antibiotics, steroidal or nonsteroidal anti-inflammatory agents. Stage one was done during the first month, and subjects were given their regular oral hygiene technics (own toothbrushing technic). Stage two was done during the second month, subjects were given instructions for using the Water Pik along with their own toothbrushing technics. Irrigating was employed two and one-half minutes, twice daily after breakfast and after supper. Irrigation was used in accordance with the manufacturer's instruction with the highest available pressure, full reservoir of water, and kept the device tip close to the teeth, but not touching them. No other forms of oral hygiene were allowed. All subjects were not to have their teeth scaled or dental prophylaxis done during the 8 - week period of the study. Scoring was done at baseline, 4 -and 8-weeks, with measurements taken of the amount of debris, calculus, plaque and the amount of inflammation present in papillary, marginal, and attached gingiva. Bleeding index and injuried to soft tissue,hard tissue and restoration were registered. Plaque scores were low after using oral irrigator. The clinical data showed more improvement in periodontal health after the 4 weeks for the water irrigation group ($P< 0.01$). Gingivitis on some interproximal decreased. Damage to restoration was not found. It would appear that irrigation alone is marginally effective in controlling plaque and gingivitis in untreated inflamed gingivae. The use of a water irrigating device will prevent the increase of gingivitis and, to some extent, decrease the gingivitis, as well as enhancing the removal of plaque in patients undergoing orthodontic therapy.

## O-17

Compressive Strength of a Glass Ionomer Cement with Antibacterial Agents.
M.G. Botelho Prince Philip Dental Hospital, Hong Kong

Recent studies have investigated the antimicrobial effect of incorporating antibacterial agents into dental materials. The addition of antibacterial agents into GIC's may be useful in restoring cavities where carious tissue may be inadvertently or deliberately left in situ. However, the addition of antibacterial agents may have detrimental effects on the physical properties of the restorative material. The aim of this pilot study was to investigate the effects on the 24 hour compressive strengths of antibacterial agents incorporated into the powder of Fuji IX. Two antibacterial agents; chlorhexidine hydrochloride (CXH), and cetrimide (CET) were added at 0% (control),1%, 3% and 6% concentration by weight of set cement into the powder of GIC. Materials were mixed according to manufacturers' instructions and 90 cylindrical specimens 6mm X 3mm diameter were mixed in a 3.0:1 powder to liquid ratio at 80-90% humidity and stored for 24 hours in deionized water. The specimens were subjected to a compressive force to failure in an Instron machine (model1185) at a crosshead speed 1mm/min and the force in MPa's calculated. ANOVA test showed highly significant reductions in compressive strength ($P=0.0001$) with the addition of of both CET and CXA to Fuji IX. Dunnets test showed significant ($P=0.01$) differences between the antibacterial test groups and the control.
Compressive strength at 24 hours; Fuji IX 226MPa SD±17.6. CET 1%= 204MPa SD± 19.3, 3%=127MPa SD±15.2, 6%= 89MPa SD±13.9, CXH 1%= 194MPa SD± 18.5, 3%= 165MPa SD± 30, 6%=160MPa SD± 13.7.

From this pilot study, it can be concluded that the addition of antibacterial agents to Fuji IX should be performed cautiously to avoid adverse effects on the physical properties. Grant CRCG 373-252-0009

## O-18

Influence of lactic acid on surface microhardness of resin-modified glass ionomer restorative materials. M. NOOR and C.G TOH* (Department of Conservative Dentistry, Faculty of Dentistry, University of Malaya, Kuala Lumpur, MALAYSIA)

Resin-modified glass ionomer restorative materials are becoming increasingly popular as restorative materials because of their improved handling property but little is known about their surface properties such as surface microhardness. The objective of this study was to evaluate the surface microhardness of 4 commercially available resin-modified glass ionomer restorative materials (Fuji II LC (improved)[1], Photac-Fil[2], Vitremer[3] and Dyract[4]), a conventional glass ionomer restorative material (Fuji IX GP[2]) and a composite material (TPH[4]) when stored in 0.01 mol/L lactic acid-sodium acetate buffer solution (pH 4.1) for 1, 7, and 28 days as compared to the surface microhardness immediately after cure.
Twenty samples of each material were fabricated for each period of storage with 10 of the samples being coated with a bonding agent (ProBond[5]). Each group of 10 specimens were kept in dark plastic containers and stored in an incubator set at 37°C ± 2°C. Measurements were taken at 23°C ± 1°C by using a Shidmadzu Microhardness Tester HMV-2000 with a Vickers diamond and 100 gm load for 15 seconds. The surface of each specimen was ground with a 1000 grid carbide paper before 3 indentations were made. Data were analyzed by using ANOVA and Newman-Keuls Multiple Range Test. Representative SEM micrographs of each group of materials studied were made.
All materials with and without bonding agent exhibited a significant progressive decrease in surface microhardnes with storage in lactic acid ($p<0.05$). SEM observations of samples after storage in lactic acid for 7 and 28 days showed surface roughness and multiple cracks on the surfaces of all conventional and resin-modified glass ionomer materials except Dyract irrespective as to whether bonding agent was applied prior to storage. There were no cracks and the surfaces remained smooth for Dyract and TPH samples.
It was concluded that exposure to an acid environment will cause adverse changes to the surfaces of resin-modified glass ionomer restorative materials. A preliminary coat of bonding agent will not protect the material against such changes.

[1,5] GC Corp, Japan; [2] ESPE, Germany, [3] 3M, USA; [4] DeTrey Dentsply, Germany; [6,7] Caulk Dentsply, USA.

## O-19

Thermocycling as a means of inducing mechanical fatigue in dental composites. NH Abu Kasim* and JF McCabe. Dental Faculty, University of Malaya, Malaysia and Dental School, University of Newcastle upon Tyne, UK.

The effect of thermocycling on the fatigue behaviour of 5 commercially available dental composites; P50(P)[1], Silux Plus(S)[2], Heliomolar(H)[3], Clearfil Photo Posterior-light activated(CLA)[4] and Clearfil Posterior-chemically activated(CC)[5] was investigated. One hundred and ten rectangular bar specimens were prepared for each material and divided into 11 groups of 10 each. Test groups 1-6 were subjected to 0, 250, 500, 750, 1000 and 10000 thermal cycles respectively. Each thermal cycle consisted of 1 minute immersion time of 50 seconds per change. The control groups 7-11 were stored in distilled water at 37°C for the equivalent time to complete 250, 500, 750, 1000 and 10000 thermal cycles respectively. All specimens were subjected to a 3 point bend test and loaded at a crosshead speed of 1mm/min on an Inston Testing Machine. The flexural strength of all materials decreases with the number of cycles and length of water storage except for CC where the flexural strength increases during the earlier stages of thermocycling and water storage. The lowest flexural strength was observed in groups 6 and 11. One way analysis of variance showed that Group 1 was significantly different from groups 6 and 11 ($P<.05$), however the thermally cycled and water storage groups were not different from each other for all materials tested. The decrease in flexural strength of all materials in the water storage groups (7-11) when compared to the 24 hour group (1) is related to weakening of resin-filler interface by hydrolysis. While the decrease of the thermally cycled groups can be attributed to debonding of matrix-filler due to variation in coefficient of thermal expansion. It can be concluded that thermal changes does not reduce the flexural strength of composites.
1,2 - 3M.USA; 3 - Vivadent, Liechtenstein; 4,5 - Kuraray, Japan